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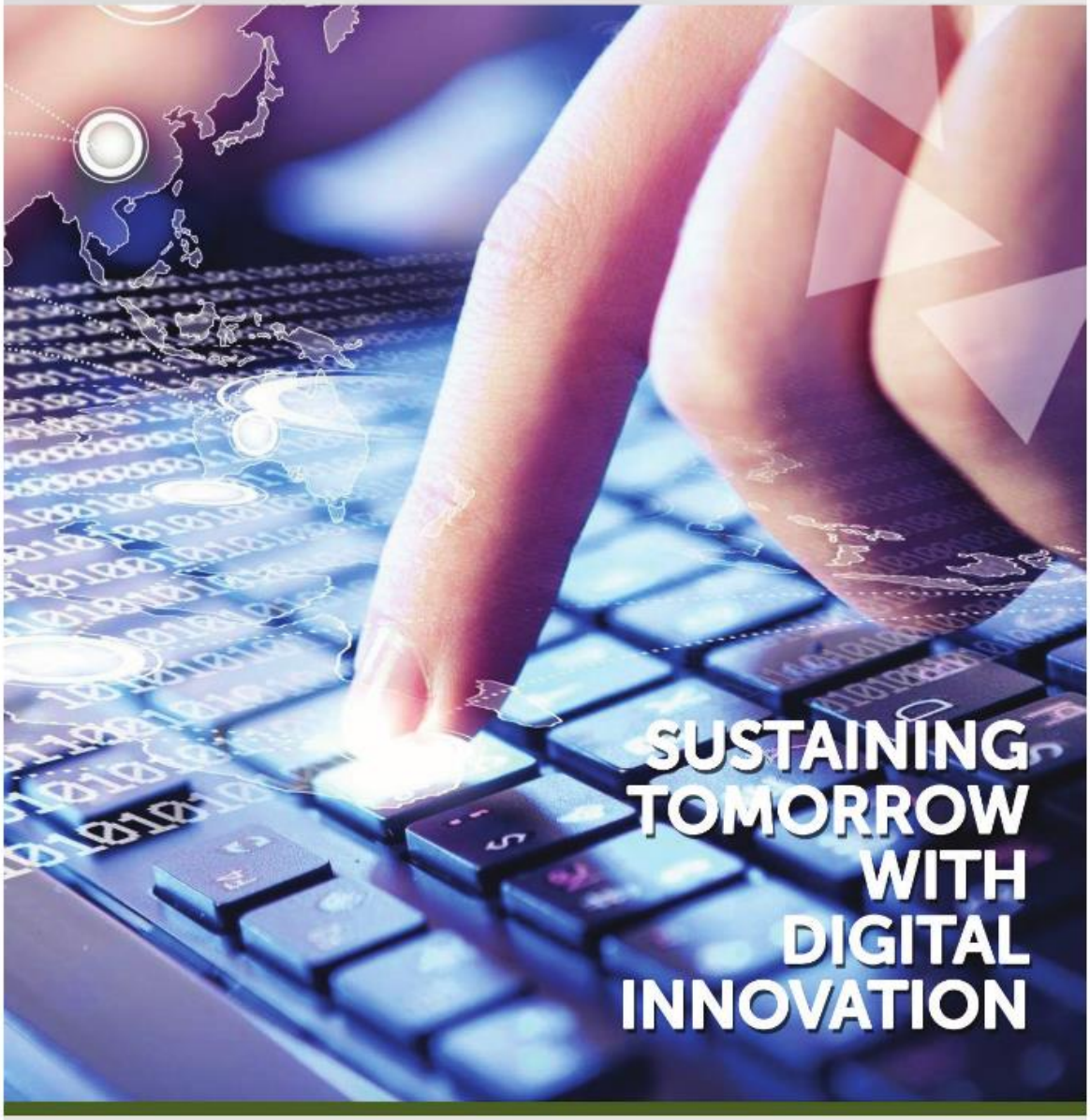

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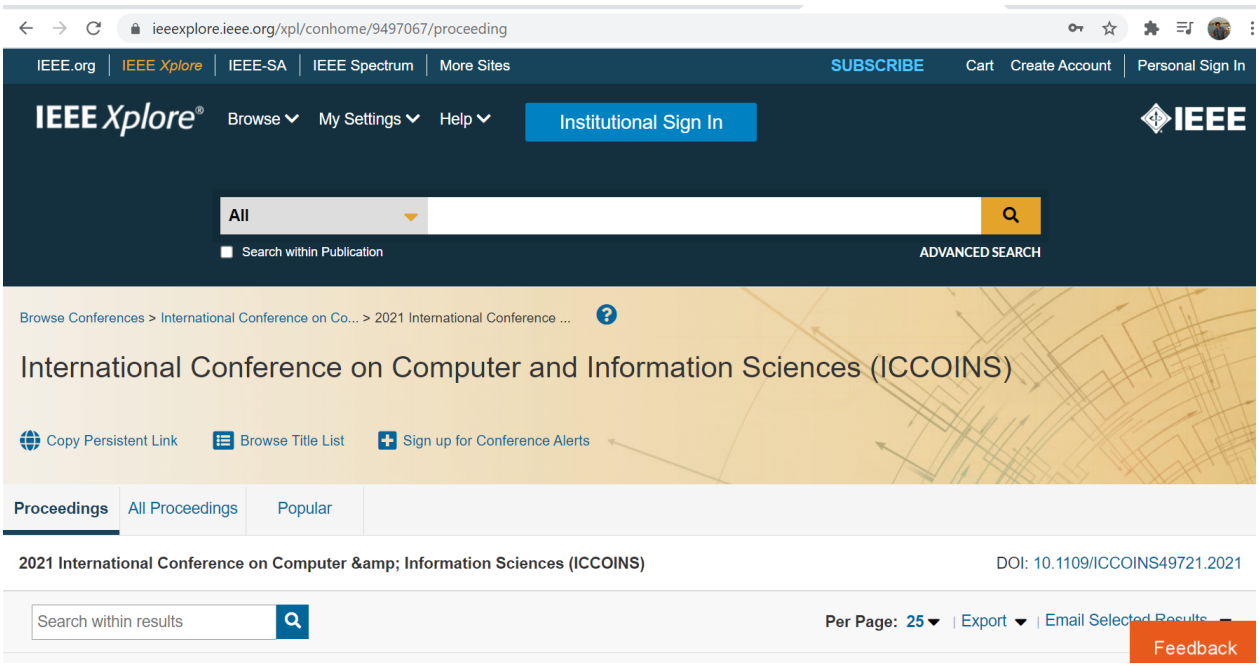

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Investor Style in Stock Investment Decisions

Publisher: IEEE

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Abstract:
Every investor has different investment behavior. These differences are called investor style. Investor style can be different because of demography, personality, and different transaction times. The purpose of this study is to reduce the mistakes made by individual investors style. Some of the methods used in this research are Analytical Hierarchy Process (AHP), secondary data, Focus Group Discussion (FGD), and stock simulation with algorithm. All of these methods emphasize the decision making process when buying and selling stocks. The results provide a set of price targets and types of stocks purchased. Accounting information remains the main ingredient for making these decisions. Accounting information that is often used is Price Book Value (PBV) to select undervalued stocks. Additional results from depth interviews, average return obtained based on the time horizon, the beginning of the transaction up to 1 year has a stock return of around 2-4 percent. A time horizon of 1-3 years will get a return of around 10 percent. Time horizon of more than 3 years, stock returns will rise again. The average long-term stock investment is around 20 percent. Personalities based on Dominance, influence, Steadiness, Conscientiousness (DISC) that fit the stock investment style tend to be a precisionist personality, a style of investor that systematically follows existing trading orders. The stock simulation method also uses a trading algorithm with stages according to the AHP results, in order to be able to see the investment style of stocks in the Indonesian capital market.

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Keywords - Analytical Hierarchy Process; Accounting Information; Algorithm Simulation Trading; precisionist

I. INTRODUCTION

Humans are having the highest nature in the universe. Humans in science are often referred to as homo economicus, not emotional and fully rational. But not entirely so, humans are homo sapiens who have ambiguous emotions, such as anger, hatred, guilt, shame, pride, regret, joy, sadness, jealousy, greed, fear, and love. This makes the discipline of economics with psychology inseparable, the two disciplines form the cognitive psychology model and the economic model is far more realistic (Turan & Latifi, 2013). This research is also the case, combining investor personality with information that is often given to investors, both investors are still learning to investors who are already proficient.

The behaviour of stock investors is unique enough to continue to be traced. There are two major groups of behaviour that researchers have observed so far. Groups that tend to look for a lot of accounting and company management information are interested in stock investors, and groups that tend to look for the right stock momentum to enter or buy stocks of the company. These two groups are often called rational investors and irrational investors. Rational investors often use fundamental analysis tools rather than technical analysis, whereas irrational investors tend to use technical analysis tools rather than fundamental analysis (Natapura, 2009).

The Nobel Prize in Economics (October 2013) also recognizes the existence of these two different poles. Pole Market Efficient Theory (Eugene F. Fama) and Pole Market Theory Not Efficient by financial behaviour (Robert J. Shiller). Market-efficient theory emphasizes information has power (information of the past, present and future) in making a decision, if the market provides information, then the market reacts quickly (a strong form of efficiency). While Inefficient Market Theory, there is an information bias for individual investors, because there are psychological aspects in decision making. Bias behaviour of individual investors such as overconfidence, over-optimism, representativeness, conservatism, availability of bias, mental accounting, and regret aversion (Byrne & Brooks, 2008).

Previous research that has been done by researchers relating to the behaviour of capital market investors is, stock investors are still considering the annual financial statements issued by issuers at the end of March or early April as part of decision making (Maretha, 2013). The annual financial statements are still relevant as part of the decision making of these stock investors supported by Natapura (2009), Kadariya (2012), Maretha, et all. (2016), in contrast to other studies which say financial statements are not part of decision making in investing in the capital market (Septyanto, 2013). Septyanto (2013) said the benefits of financial information were not significant to revise investor beliefs in buying or selling company stocks. The factors that most influence it is information that is shared by friends, colleagues or family and not directly from the company's performance. This is often called herding behaviour (Banerjee, 2008; Baddeley, 2012).

The two groups and the two poles mentioned above have made researchers develop investor behaviour towards personalities, company life cycles, and company valuations that have been listed on the Indonesia Stock Exchange (IDX). Researchers see that there are three large groups of companies listed on the IDX, namely BUMN (4.8%), BUMD companies (0.6%) and Private companies (94.7%). These three groups of companies have different characteristics in giving corporate actions. BUMN and BUMD companies often give part of their profits to investors in the form of dividends. However, the BUMD sometimes gives a slightly greater dividend than a BUMN. This is due to the fact that most of the stocks owned by BUMD companies are held by investors who are in the area, while the majority of BUMNs are owned throughout the archipelago.

Three major groups of companies listed on the IDX will first be mapped to the company's life cycle. Mapping starts from a new company listed on the IDX or an Initial Public Offering (IPO) entering the start-up stage, then the company enters the growth stage, after which the company enters the maturity stage, and also maps the companies that decline (decline). Mapping the company is done by looking at the company's cash flow over the past three years. After mapping the company's life cycle, researchers will enter into the valuation of the company's valuation or the valuation of its assets. The purpose of researchers doing this, researchers will create a model of stock investor behaviour that shows the two different poles. Mapping data is the basis for asking individual investors the decision to make a purchase, sale, or hold.

II. Ease of Use

A. Market Information

Lipe (1998) uses accounting information and market information in risk assessment and making investment decisions. His experimental study examined the risk considerations and decisions of individual investors to invest influenced by variables (yield variance and yield covariance with market yields) and accounting risk measurement. The accounting data used in his study are in the form of current ratios, solvency ratios, and profitability ratios over the past five years, as well as market data in the form of market indexes for the past five years. The results of his study said variance, covariance, yield expectations have an effect on investment decisions and risk assessment.

This study provides an overview of investment strategies that are often used by scholars is a top down analysis. Therefore, researchers provide a macroeconomic picture that directly impacts the capital market to individual investors. Macroeconomic data shown are GDP, inflation, and interest rate. Then, given industry information that can be seen virtually with technical analysis. Furthermore, the performance of companies that want to be purchased such as Price Book Value (PBV), Return on Assets (ROA), Return on Equity (ROE), and undervalues or overvalues of Price Earnings Ratio (PER).

Figure 1 shows the main trading display will be divided into 2 moments, both based on the information presented to the research subjects. The first display during the initial 15 minutes of the information presented is more technical in nature. Meanwhile, in the next 15 minutes the display will change with more informational content to the company's fundamentals. Figure 1 also shows the initial interface in the main menu of the HiFu software, simulating the first 15 minutes of stock trading.

Figure 1: Market Information in Stock Simulation

Source: HiFu Smulation Program (2019)

B. Accounting Information

Behavioural accounting research emerged in the 1950s to the present. The focus of his research, investigates how users of accounting information make decisions and what information they need.

Research related to capital markets and accounting often uses Kothari (2001) which says there is a relationship between capital markets and financial statements. The main sources of empirical research demand in the capital market in accounting are fundamental analysis, valuation, and market efficiency testing. Fundamental analysis using financial ratios to predict future profits, using the time-series forecasting method and forecasting analysis. As a result, ratios can predict revenue growth. The size of existing ratios also predicts trading strategies by exploiting information about revenue growth. This revenue prediction signal also produces abnormal returns. Then the inefficient market also requires accounting information in the company's financial statements.

Lawrence and Kercsmar (1999) research on the process of tracking information selection activities by decision makers is used to assess the importance of accounting-based, market-based, and analyst-based information in investment decisions. The steps taken are through a number of questions, such as: What information is considered for general information? How to select useful information? What judgment or decision was made?

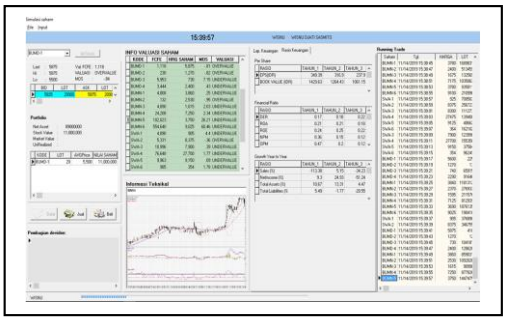


Figure 2: Accounting Information in Stock Simulation

Source: HiFu Smulation Program (2019)

Figure 2 shows the main trading menu display there is some important information. First, related to the regional government stock code (BUMD-1). Information about

prices, portfolios, dividend distribution, technical information and information on macroeconomic conditions. Technical information will refer to the selected stock code, so that if the code is changed, the technical information will change according to the stock code that appears. Second, related to the code of stocks owned by the state (BUMN), as well as private stocks. Meanwhile, running trading moves according to the daily transaction data that has been entered in the system. The stock price will change according to the stock price value that appeared last in running trading. The time needed for each subject is approximately 30 minutes. The time indicator can be seen from the movement of the status bar. The status bar is at the bottom of the main stock trading simulation application program display. The main display of the HiFu stock trading software after the next 15 minutes will look like in Figure 2.

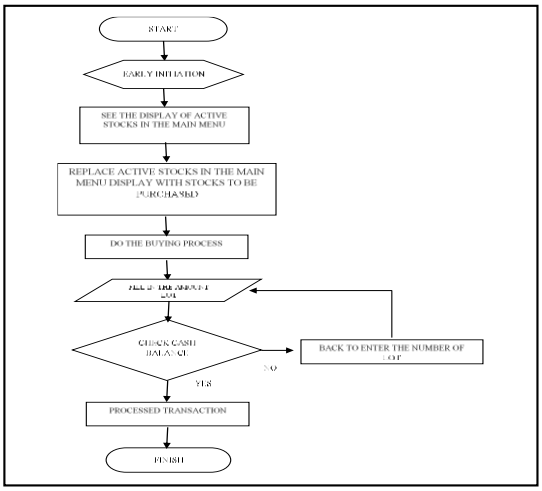
Figure 3: Accounting Information and Technical Analysis

Source: HiFu Smulation Program (2019)

Figure 3 shows technical information and fundamental information more clearly. Research subjects can be done right click on the graphic image of technical information. The display can also be used to compare two stocks at once by selecting multiple stocks. This can be done, if the menu bar appears after right-clicking on the chart of fundamental information. The display above will change according to the desired stock code option. This information aspect will provide an overview of the historical conditions of the stocks that are the samples of this experimental research.

To carry out the process of buying and selling stocks, you can click on the buy or sell button in the main view of the trading simulation. The first procedure that must be done by the respondent is to make a purchase first with an investment of Rp. 100,000,000, -. The purchase process can be done by clicking the buy button so that the display will appear as shown in Figure 3.

Figure 4: Algoritma in Stock Buy Transactions

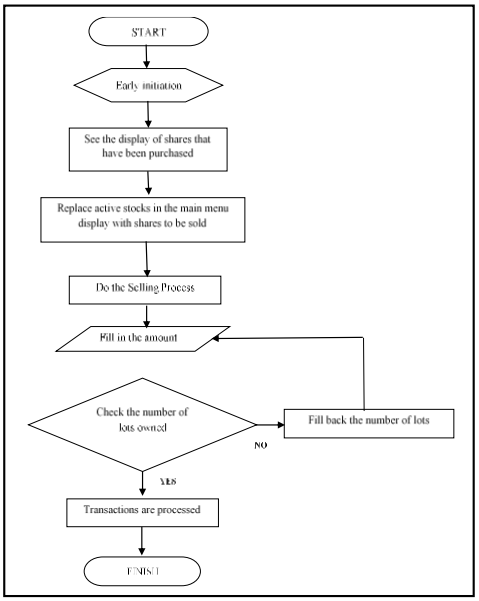


Source: HiFu Smulation Program (2019)

Figure 4 shows Client Id, respondent name, stock code and share price will automatically appear in the form fields. Subjects can change the number of lots to be purchased. This is intended to minimize the possibility of program errors in the calculation of trading results. If you want to change the stock code you want, it must be done from the main trading view by first canceling the buy transaction that will be carried out. The buying process is only limited by the amount of capital, which will automatically decrease if the respondent carries out buying activities.

Figure 5 shows the share selling process is also done by simply determining the number of lots of stocks to be sold. The number of stock lots will be a filter for the respondent, because if the respondent sells more than the number of lots he owns. Therefore, the program will issue a warning and automatically cancel the sale transaction. The main view is important because it is hoped that respondents will see and consider all the information presented, such as fundamental, technical and corporate action (dividend distribution). All transactions that occur are stored immediately.

Figure 5: Algorithm in Stock Sell Transactions

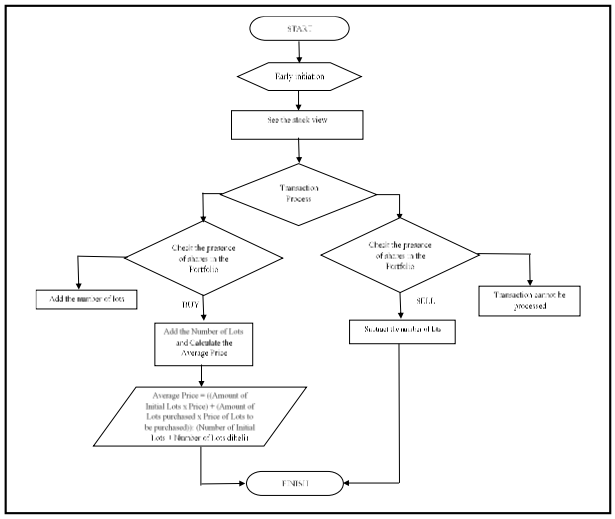


Source: HiFu Smulation Program (2019)

Figure 6 shows building a portfolio, actually an integral part of the buying and selling process in this stock simulation software. The initial process of calculating the formation of a portfolio begins with "initialization" by identifying the number of lots of stocks that have been bought and that have been sold. The results of this identification are the number of stocks in hand with a price that refers to the average price. Changes in portfolio position will occur if investors carry out a buying or selling process. When the buying process is carried out, an examination will be carried out on the existence of stocks owned. If the stocks that have been purchased have been previously owned, the number of lots purchased will be added to the stocks with the same code. Meanwhile, the price will be calculated using the weighted average approach. However, if the identification results of the existing portfolios do not find stocks with the same code as the stocks purchased, the share code will be added directly to both the number of lots and the acquisition price. When

the buying process is successful, it will be continued by reducing the amount of cash in hand, minus the nominal amount of the share purchase. During the share selling process, an examination will be carried out on the presence of stock codes in the portfolio. If the stock is not found then the transaction will be canceled. But if a stock is found then the number of lots in the portfolio will be compared with the number of lots to be sold. The maximum number of lots to be sold is the same as the number of lots in the portfolio. If the number of lots sold is less than or equal to the number of lots in the portfolio, the transaction will take place. The number of lots in the portfolio will decrease as much as the lots sold. Furthermore, the sales proceeds in the form of cash will be added as assets.

Figure 6: Algoritma Portfolio in Stock Simulation



Source: HiFu Smulation Program (2019)

III. METHODOLOGY

This research has three stages, namely filling the DICS personality, simulating buying and selling and holding of stocks, and conducting FGDs so that it can multiply the behaviour of individual investors in the city of Semarang, Indonesia. Besides that, the researcher mapped key words when the FGD became a quantitative variable by distributing investor behaviour questionnaires to individual investors who took stock Trading Algorithm Simulation for 30 minutes.

Each question was also adjusted to the questions posed during the FGD. A FGD is also recorded when recording a discussion about the behaviour of both the investor being observed or the individual investor himself, then the voice recording is done verbatim so that keywords and keyword frequencies appear in each FGD. The next stage is an Analytical Hierarchy Process (AHP) assessment by means of each criterion (table 1).

A. DISC Personality

Some of the measurements of personality one of the measuring tools that are simple in the process, interesting, have good validity and reliability and are quite easy to learn are DISC (Dominance, Influence, Steadiness, Compliance). This DISC test provides a description and character of a person's personality that can predict future behavioural tendencies. This is obtained from evaluating the main personality factors that exist in a person. DISC provides an advantage in ease of use, because this test only takes a maximum of 15 (fifteen) minutes to complete the twenty-four (24) questions contained therein. This personality test, a person will be confronted with four adjectives in a number and they are asked to choose one word that they think best suits him and one more word that does not suit him best. Expertise interpretation of personality dynamics in this measuring instrument can be seen from the graph is the key to the accuracy of the analysis. When this is available the results of interpretation of the work of DISC can be done by using a software automatically so that it will be very easy for interpreters to know the character of one's personality.

Basically DISC measures a person's personality traits, namely Dominance, Influence, Steadiness, and Compliance, which can show a picture of the tendency of behaviour of an individual. DISC can help understand "why someone does something". Besides that, the dynamics of the dimensions of Dominance, Influencing, Steadiness, and Conscientiousness in each different person form a personal DISC model (style) that can describe each other's behaviour.

B. Focus Discussion Group (FGD)

The FGD was conducted in two sessions, the first session was at noon around 3:00 PM - 4:00 PM Western Indonesia Time (WIB), while the second session was around 5:00 PM - 6:00 PM WIB. Because during the fasting month FGD, the second session was more than the first session, because it was closed by breaking the fast together. The first FGD results, respondents prefer trading rather than holding for too long. Macro information which is often seen by Dow Jones' condition is only the condition of Indonesian politics, not its Macro information. Therefore, researchers conducted other research models that show macro information having an impact on aquatic information and technical information.

FGD was conducted for 30 minutes. Emotion Bias is the experience of buying stocks of BUMN, BUMD and Private having experienced loss aversion, overconfidence, overestimate by using fundamental analysis or technical analysis. Cognition bias is also the same, have you ever experienced the regrets of buying BUMN or BUMD or Private stocks. The information obtained is hoax information (cognitive dissonance) that makes the decision incorrect.

Table 1: Analytical Hierarchy Process

1	Both elements are equally important	Criteria:	1	The behavior of targeted investor & accuracy
3	One element is a little bit more important than the other one		2	Investor behavior, relationship & self-assessment
5	One element is more important than the other one		3	Investor Behavior, Choosing Information & Surrounding Environment
7	One element is far more important than the other one		4	Technical Analysis Behavior
9	Absolutely more important		5	Fundamental Analysis Behavior
2,4,6,8	The mean value between two adjacent opinions			

Source: Saaty (1987); Sitinjak, et al. (2019)

C. Analytical Hierarchy Process (AHP)

The next stage, AHP test was carried out. This study uses analytical hierarchy process (AHP) for each criterion that is examined. AHP is used to achieve the goal of this research by reducing the behaviour bias of individual investors when buying, selling, or holding stocks. AHP is very suitable with the decision making process that can be made in stages. Each criterion has a different hierarchy for its continuous approach.

The AHP process as a whole has the following stages: (1) Creating a hierarchy model to be questioned; (2) Setting priorities by providing criteria for each level (table 2); (3) Measuring consistency; (4) Evaluating consistency where CR <0.1 (Tabl1 1). After testing with AHP, the results of FGD, AHP and circulating questionnaires, researchers made several models of processed data obtained either by filling out questionnaires, interviews, or mapping behaviour based on the age of experience doing stock investment transactions.

D. Model-Model

The results of the AHP model are seen (Table 2), each decision maker prefers to achieve the target in accordance with the planning that has been done. Investors prefer a good relationship with fellow investors. Individual investors will also enjoy a comfortable environment in conducting transactions. Individual investors will also buy if MA 20 is below MA 50, the decision to sell stocks because prices will move down. Investors also see the level of financial risk in the last 3 years, if it is risky, it will not buy it for investors who are afraid of risk, and vice versa for investors who like risk but can see the future prospects of the performance that will result if financial risk (long-term liabilities) is used to company expansion going forward.

F4	**TECHNICAL ANALYSIS**	
9	AT07	Investor individu mengerti akan perpotongan garis, dimana MA 20 berada di bawah MA 50, maka keputusannya menjual saham karena harga akan bergerak turun.
7	AF02	Individual investors when choosing shares do not consider the working capital owned by the company to be purchased.
5	AT09	Individual investors see the intersection of lines, where MA 20 is above MA 50, then the decision to buy shares because prices move up
F5	**FUNDAMENTAL ANALYSIS**	
9	AF06	Individual investors see the stock selection tends to see the level of financial risk in the last 3 years.
7	AF18	Individual investors will make the decision to sell shares if the intrinsic (fair) price is smaller than the market price (overvalued).
5	AF04	Individual investors will see the company selected for stock investment has a smaller proportion of long-term debt than its equity.
3	AF07	Individual investors will make the decision to buy shares when they see how much the manager manages the company's operations to be efficient.

Table 2a: Decision Making Model

Source: Sitinjak, et al. (2019)

The decision model is required to be a model of the process of buying, selling, and holding a stock investment. Stages starting from technical analysis information, see historical data formed by closing prices of stocks. Then see accounting information from profitability and corporate action taken by the company. The corporate action is in the form of dividends, reverse stock split, and right issues. The final stage of Figure 3 model is the target and accuracy of each information and investment strategy carried out.

Table 2b: Decision Making Model

F1	**DM BASE ON TARGET & ACCURACY**	
9	PIP14	Individual Investors Trying to Achieve Targets According to Planning
7	PIP15	Individual Investors Trying to Do Precision in Doing the Main Work
5	PIP13	Individual Investors Trying to Have High Accuracy Standards in The Stock Investment Transaction
3	PIP16	Individual Investors Are Trying to Be Comfortable and Liking the Environment When Less Clearly the Regulations So That Can Be Flexible
F2	**DM BASE ON RELATION & SELF JUGMENT**	
9	PIP03	Individual investors feel uneasy when making decisions that can have a negative impact on others
5	PIP02	Individual investors feel there is a disadvantage, then individual investors will think again on the decisions that have been taken
5	PIP10	Individual investors feel confrontational often with fellow investors or brokers.
F3	**DM BASE ON ACCOUNTING INFORMATION & ENVIROMENT CONDITION**	
9	PIP04	Individual investors feel like the work environment to be able to make a comfortable stock investment transaction.
7	PIP12	Individual investors feel the need to know in detail and like to look at things that exist in the workplace environment or a place to share transactions.
5	PIP30	Individual investors will buy shares because they understand the accounting information of the shares have a good and profitable performance in the present or future
3	PIP20	Investor individu menyukai perubahan yang mendadak

Source: Sitinjak, et al. (2019)

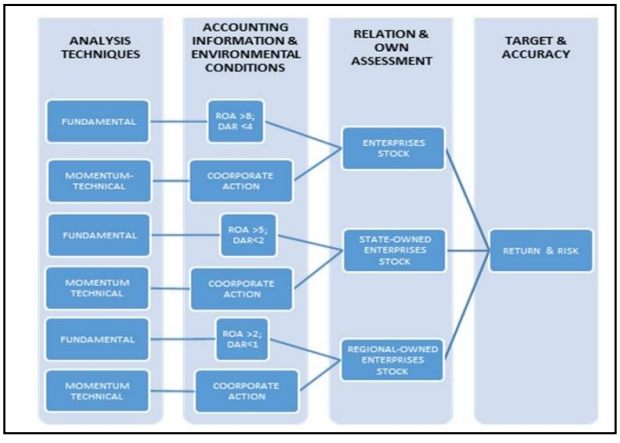
The next stage, the model that emerges is the least-square partial analysis. Where, each variable used such as macro information, accounting information, and technical information is made quantitative and has a possible formula as below.

$$MI = \alpha + \beta AI + \beta_2 TI + \varepsilon \quad \text{..... (i)}$$

$$BF = \alpha + \beta AI + \beta_2 TI + \beta_3 PI + \varepsilon \quad \text{..... (ii)}$$

Note that the equation is centered using a center tab stop. Be Where: α = Constant; β = Regression Coefficient; BF = Behavior Finance; AI = Accounting Information; TI = Technical Information; PI = Investor Personality; ε = Error.

Figure 7: Model of Buying-Selling-Holding Individual Investor



Source: Sitinjak, et al. (2019)

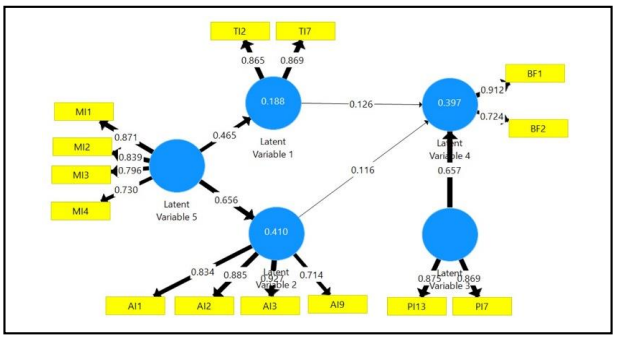
IV. RESULTS

The results of research for personalities, individual investors in the city of Semarang-Indonesia tend to be Precisionist styles (C and S). Precisionist styles is a systematic thinker who tends to follow procedures both in personal and business life. Continue in an orderly manner, the way that has been established. Precisionist is precise in paying attention to details. They acted very wisely, diplomatically and were rarely hostile to their colleagues. Being very thorough, precisionists go to great lengths to achieve accuracy in work and maintain high standards. Precisionist tends to get caught up in details, especially when decisions must be made. They want a standard operating procedure and there are no sudden changes.

As a Precisionist, they like a protected and safe environment that is governed by rules and regulations. A precisionist likes people, but prefers some close friends to be recognized. Precisionist prefers small groups to many people. They will use most of their time to ascertain how precisely they are. Precisionist is too sensitive and might not handle criticism well. They need to develop self-confidence and be more independent. They tend to worry a little about what people think of them and they avoid conflict and change at all costs.

Being precise is very important in all respects for precisionists. They can be relied upon to carry out any task correctly. They want the real facts and figures before they will make a decision. They will feel uncomfortable when forced to make quick decisions. Precisionist will often maintain feelings for themselves. Others may not realize that they have strong beliefs. Precisionist will not explode easily when depressed or stressed, but is likely to withdraw. They want a stable home and work environment that promotes security. The more stable, organized and non-confrontational the environment, the happier it will be.

Figure 8. Model Behavioural Finance Information



Source: Data processed (2019)

The results of the FGDs are three things that are often mentioned, namely, first, macro information is not often used in stock transactions. There are three types of investors, fundamental investors, technical investors, and mix of fundamental and technical investors (hybrid investors). The second discovery in the FGD is that individual investors will form their own investment strategies in the third year. If you remain an investor in the third year, he will reduce his anxiety and doubts when making a stock transaction. The third determination in the FGD, that investors are more inclined to homo sapiens than homo economicus, if there is a crisis occurs or a huge loss, then only investor relations with Him (the Creator of the Universe) can provide power and enlightenment in stock investment transactions.

Qualitative results are made quantitative, then the individual investor behaviour model shows the investor's personality that forms the pattern of the transaction strategy. Market information is more absorbed in accounting and technical information. When confronted directly with the latent variable macro information on financial behaviour, it has no effect (figure 2). Unlike the second model, macro information affects accounting information and technical information, not directly to the financial behaviour of individual investors.

V. CONCLUSION

Individual investors have a target in investing in stocks. Individual investors also have the accuracy of information that individual investors absorb. Macro information goes into technical and fundamental information, so individual investors are more likely to use their personalities in forming stock investment strategies. Individual investors in Indonesia tend to have precisionist styles (a combination of Compliance and Steadiness,). Precisionist styles is a systematic thinker who tends to follow procedures both in personal and business life. Investor behaviour towards emotions, anxiety, and euphoria will be more manageable when individual investors step into the third year as investors. This is formed in investors from a mixture of personality and learning while buying, selling and holding stock investments.

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